

4/18/17

"Too many of us are not living our dreams because we are living our fears." -Les Brown

HW: "Area Between Curves" #3 and #4
Test 1 on Tuesday 5/2

AIM: Area Between Curves cont.

Area between 2 curves:

$$\text{Area} = \int_a^b (\text{Top} - \text{Bottom}) dx$$

where a, b are the points of intersection that form the area in question.

1. The diagram opposite shows the curve $y = 4x - x^2$ and the line $y = 3$.

- (a) Find the coordinates of A and B.
(b) Calculate the shaded area.

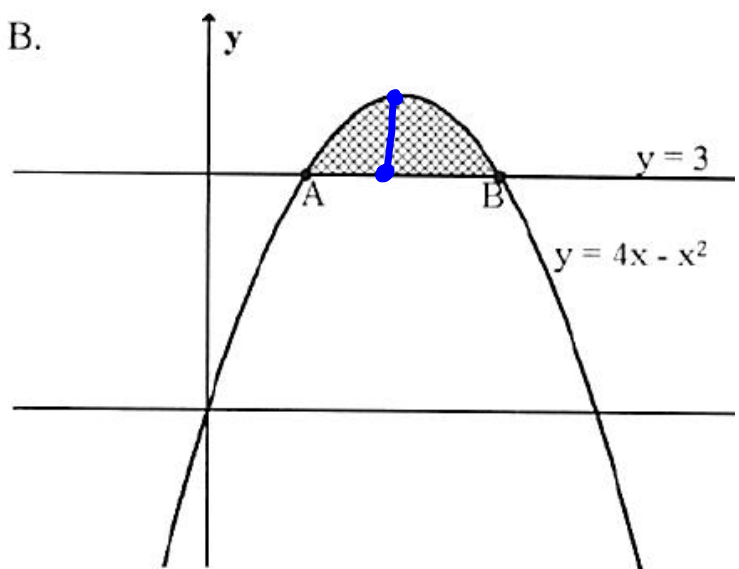
$$a) \quad 3 = 4x - x^2$$

$$x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x=3 \quad x=1$$

$$B=(3,3) \quad A=(1,3)$$



$$b) \quad \text{Area} = \int_1^3 (4x - x^2 - (3)) dx$$

$$\boxed{\text{Area} = \frac{4}{3} \text{ units}^2}$$

2. The curves with equations $y = x^2$ and $y = 2x^2 - 25$ intersect at P and Q.

Calculate the area enclosed between the curves.

$$x^2 = 2x^2 - 25$$

$$0 = x^2 - 25$$

$$(x-5)(x+5)$$

$$x=5 \quad x=-5$$

$$\text{Area} = \int_{-5}^5 (x^2 - (2x^2 - 25)) dx$$

$$= \int_{-5}^5 (-x^2 + 25) dx$$

$$= \left[-\frac{x^3}{3} + 25x + c \right]_{-5}^5$$

$$= \left(-\frac{5^3}{3} + 25(5) \right) - \left(-\frac{(-5)^3}{3} + 25(-5) \right)$$

$$\left(-\frac{125}{3} + 125 \right) - \left(\frac{125}{3} - 125 \right)$$

$$\left(-\frac{125}{3} + \frac{375}{3} \right) - \left(\frac{125}{3} - \frac{375}{3} \right)$$

$$\left(\frac{250}{3} \right) - \left(-\frac{250}{3} \right)$$

$$\frac{500}{3} \text{ units}^2$$

